JUNIOR CERTIFICATE EXAMINATION

2002

TECHNOLOGY

HIGHER AND ORDINARY LEVELS

CHIEF EXAMINER'S REPORT

1. INTRODUCTION

The examination in Technology is offered at Higher and Ordinary levels. In 2002 a total of 2921 candidates presented for the examination, of whom 2242 (76.8%) opted for Higher Level and 679 (23.2%) opted for Ordinary Level. When compared to last year's figures this reflects a 5.7% decrease in the overall numbers presenting for examination in the subject and a 4.7% increase in those opting for Higher Level.

Marks are allocated to the different examination components as follows.

HIGHER LEVEL

Design Task	200 marks
Written Paper	200 marks

ORDINARY LEVEL

Design Task	240 marks
Written paper	160 marks

Design Tasks

The list of design tasks was sent to examination centres in early November 2001 and each candidate had to select one. The design tasks had to be completed by 7 May 2002 and retained in schools for marking. The design tasks were laid out in schools, and were marked by a team of visiting examiners in June 2002.

Written Examinations

The structure of the two examination papers is as follows.

HIGHER LEVEL

Time	2 hours	200 marks
Section A	Thirty-two short questions, answer any twenty-five	100 marks
Section B	Four questions, answer any two	50 marks
Section C	Four questions, answer any one	50 marks

ORDINARY LEVEL

Time	2 hours	160 marks
Section A	Twenty short questions, answer any sixteen	80 marks
Section B	Four questions, answer two	80 marks

2. PERFORMANCE OF CANDIDATES

The following tables give details of the grades achieved by candidates taking Higher Level and Ordinary Level Technology in 2002.

Table 1: Numbers of females and males achieving each grade in Higher Level Technology in 2002

	A	B	C	D	E	F	NG	Totals
Total candidates	228	770	761	383	75	22	3	2242
%Candidates	10.2	34.3	33.9	17.1	3.3	1.0	0.1	
Total female	80	230	183	84	23	7	0	607
%Female	13.2	37.9	30.1	13.8	3.8	1.2	0	
Total male	148	540	578	299	52	15	3	1635
%Male	9.1	33.0	35.4	18.3	3.2	0.9	0.2	

Table 2: Numbers of females and males achieving each grade in Ordinary Level Technology in 2002

	A	B	C	D	E	F	NG	Totals
Total candidates	46	208	218	118	55	32	2	679
%Candidates	6.8	30.6	32.1	17.4	8.1	4.7	0.3	
Total female	20	85	74	37	17	10	1	244
%Female	8.2	34.8	30.3	15.2	7.0	4.1	0.4	
Total male	26	123	144	81	38	22	1	435
%Male	6.0	28.3	33.1	18.6	8.7	5.1	0.2	

Design Tasks

HIGHER LEVEL

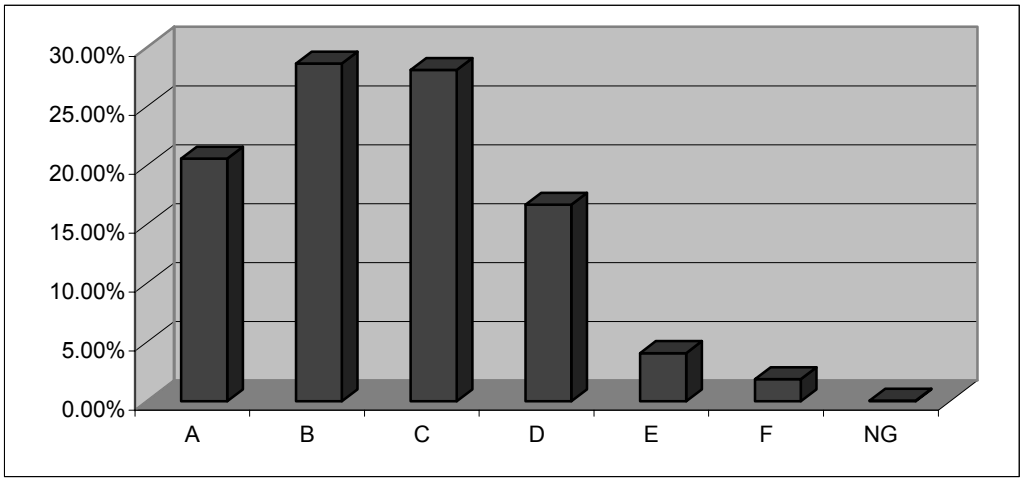
The design task comprised two components, a folder and an artefact. The folder was allocated 80 marks (40% of total) and the product was allocated 120 marks (60% of total).

A total of 2255 tasks were examined at Higher Level. This represented 79% of all candidates taking the subject. The table and chart below show the breakdown of grades awarded for this component.

Table 3: Numbers and percentages of candidates achieving each grade in Higher Level design tasks in 2002

	A	B	C	D	E	F	NG	Total
No. of candidates	464	646	634	376	92	42	1	2255
% of candidates	20.6	28.6	28.1	16.7	4.1	1.9	0.0	

Chart 1: Distribution of grades in Higher Level design tasks in 2002

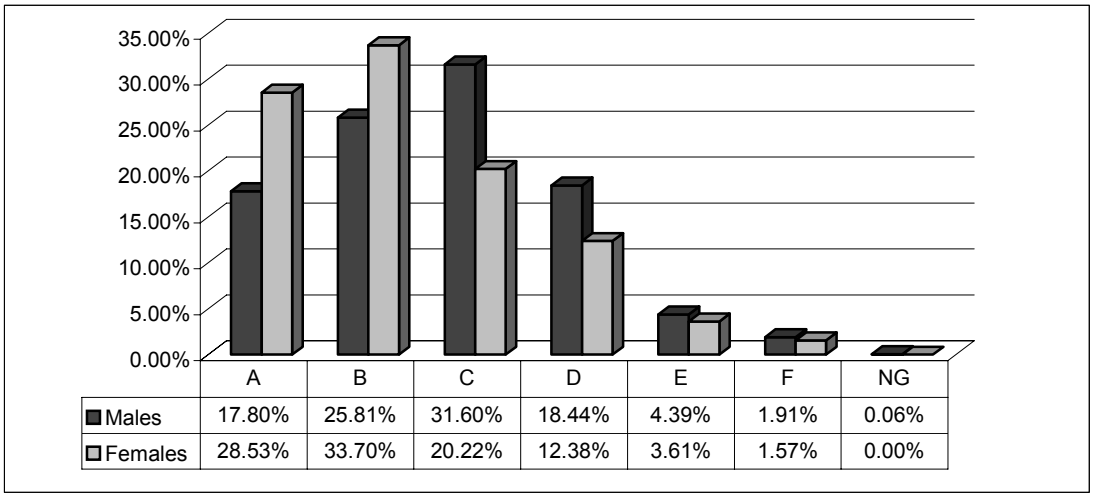


This year, for the first time, two different marking schemes were produced, one for Ordinary Level and the other for Higher Level. This allowed a separate set of results to be generated for Higher Level for the first time. Consequently, the results shown above reflect the performance of Higher Level candidates for the year 2002 and cannot be compared with previous results, which were combined results from both levels.

As in previous years, the creativity and presentation of tasks by females was significantly better than that of males. Hence, females obtained, on average, better results than males did. For example, 28.5% of females achieved an A grade compared with only 17.8% of males.

The following chart outlines the design task results according to gender.

Chart 2: Distribution of grades for males and females in Higher Level design tasks in 2002



	A	B	C	D	E	F	NG
Males	17.80%	25.81%	31.60%	18.44%	4.39%	1.91%	0.06%
Females	28.53%	33.70%	20.22%	12.38%	3.61%	1.57%	0.00%

All candidates were given the choice of executing one of seven tasks, however 46% of females chose Task B (the toy) whilst 33% of males chose Task D (the crane). The second most popular task amongst females was the water generator (chosen by 17%) and amongst males was the toy (chosen by 24%).

The following charts give a breakdown of task popularity amongst males and females.

Chart 3: Percentages of females choosing each task at Higher Level in 2002

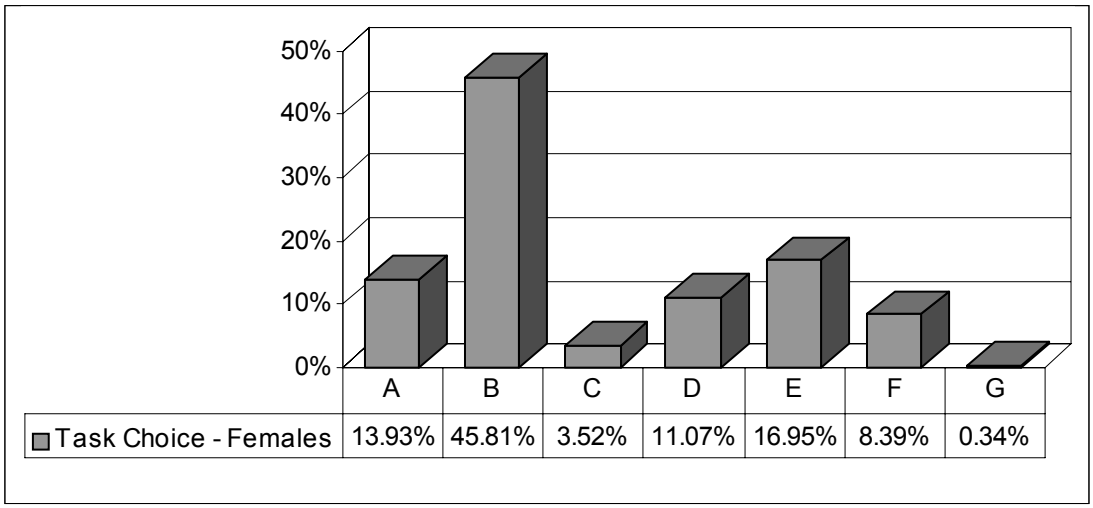
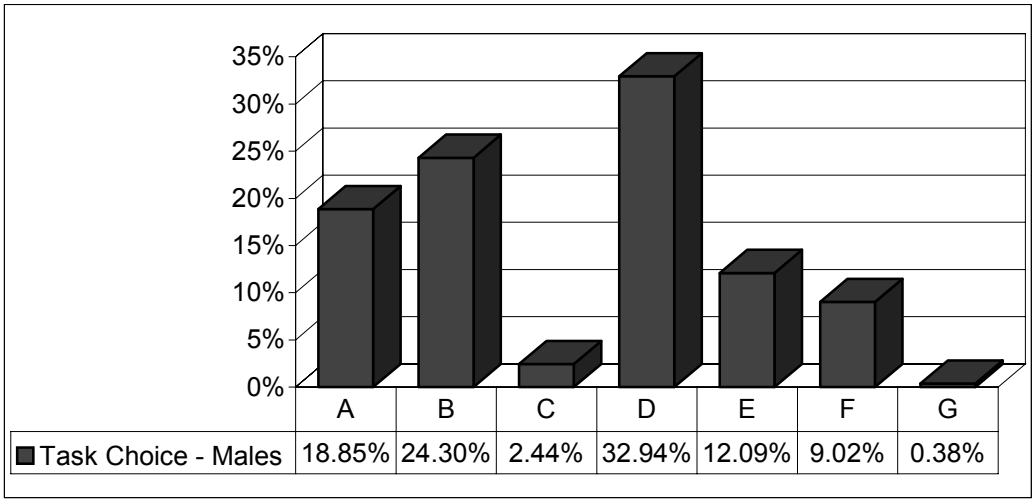


Chart 4: Percentages of males choosing each task at Higher Level in 2002



The overall standard of work presented showed an improvement on previous years. The majority of folders followed the required sequence and the artefacts were well executed. The integration of the subsystem component (mechanical/electronic) was the weakest aspect in most cases.

ORDINARY LEVEL

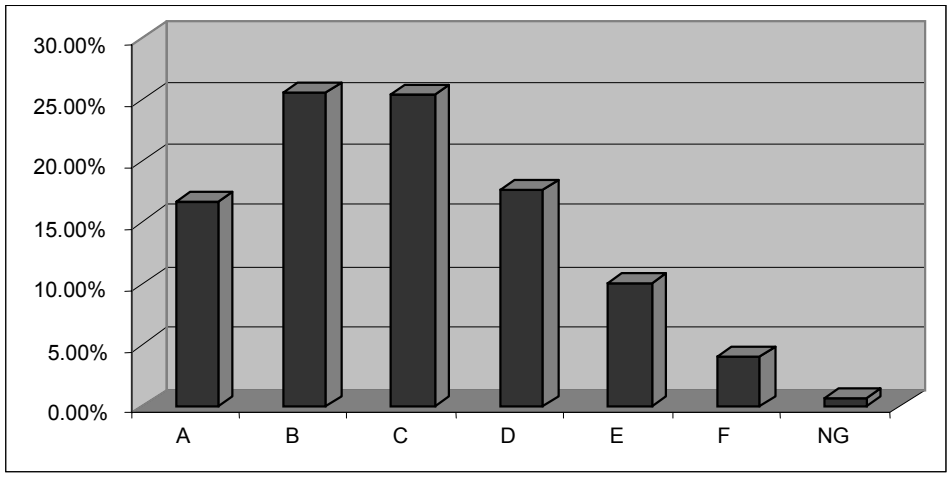
At Ordinary Level the Technology Task is allocated 240 marks out of a total of 400. The written paper accounts for the remaining 160 marks. The task contains two key elements: a folder and a product. The folder is allocated 96 marks (40% of total) and the product is allocated the remaining144 marks (60% of total).

A total of 590 tasks were examined at Ordinary Level. This represented 20% of all candidates taking the subject. The table and chart below show the breakdown of grades awarded for this component.

Table 4: Numbers and percentages of candidates achieving each grade in Ordinary Level design tasks in 2002

	A	B	C	D	E	F	NG	Total
No. of candidates	98	151	150	104	59	24	4	590
% of candidates	16.6	25.6	25.4	17.6	10.0	4.1	0.7	

Chart 5: Distribution of grades in Ordinary Level design tasks in 2002

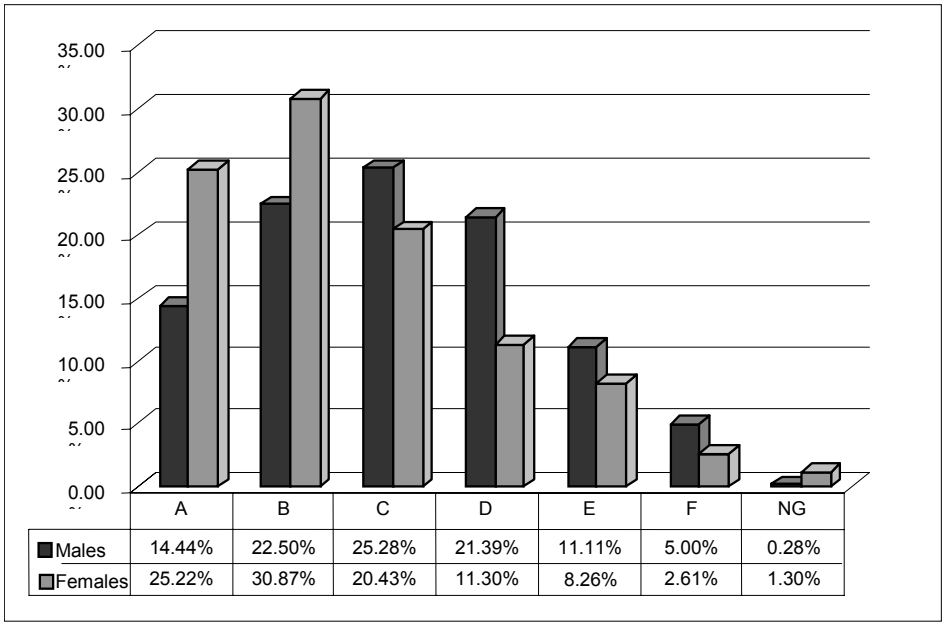


This year, for the first time, two different marking schemes were produced, one for Ordinary Level and the other for Higher Level. This allowed a separate set of results to be generated for Ordinary Level for the first time. Consequently, the results shown above reflect the performance of Ordinary Level candidates for the year 2002 and cannot be compared with previous results, which were combined results from both levels.

As at Higher Level, females achieved significantly better results than did males. For example, 25.2% of females achieved an A grade compared with only 14.4% of males.

The following chart outlines the design task results according to gender.

Chart 6: Distribution of grades for males and females in Ordinary Level design tasks in 2002



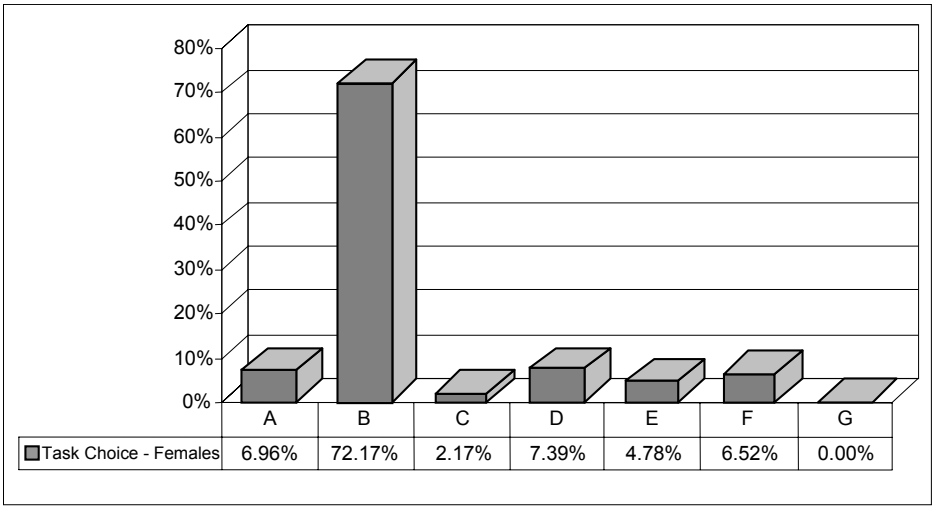
	A	B	C	D	E	F	NG
Males	14.44%	22.50%	25.28%	21.39%	11.11%	5.00%	0.28%
Females	25.22%	30.87%	20.43%	11.30%	8.26%	2.61%	1.30%

Task Choice

All candidates were given the choice of executing one of seven tasks. The most popular task was Task B (the toy), which was selected by 72% of females and 37% of males. The second most popular task was the water generator. This task was selected by 7% of females and 31% of males.

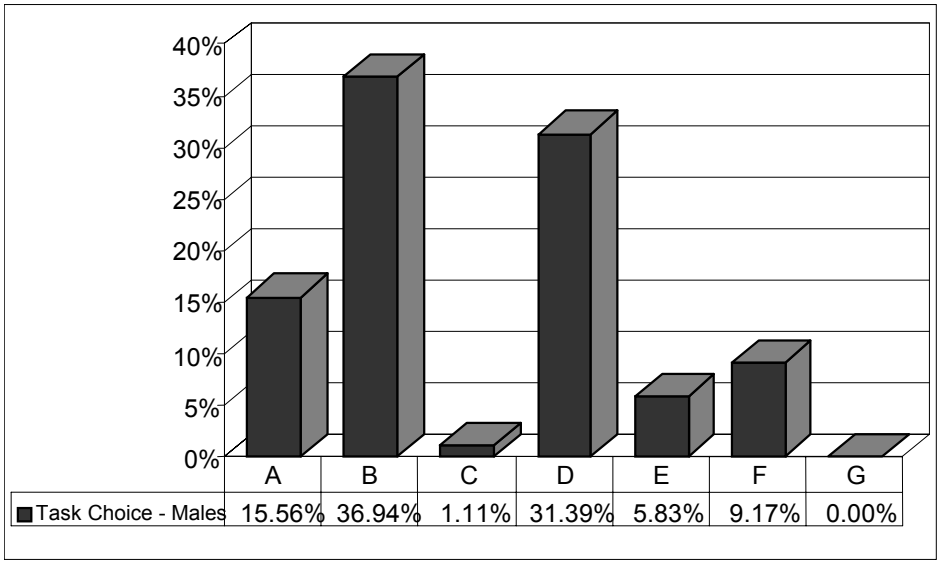
The following charts give a breakdown of task popularity amongst males and females.

Chart 7: Percentages of females choosing each task at Ordinary Level in 2002



	A	B	C	D	E	F	G
Task Choice - Females	6.96%	72.17%	2.17%	7.39%	4.78%	6.52%	0.00%

Chart 8: Percentages of males choosing each task at Ordinary Level in 2002



3. ANALYSIS OF CANDIDATE PERFORMANCE

Design Tasks

Each candidate chose any one of the following design tasks. Different marking schemes were applied at Higher and Ordinary Level.

Task A

Design and make a model of an electro-mechanically controlled vehicle that will stop automatically when it travels over a dark surface.

This was the third most popular task amongst both males and females, being chosen by 19% of males and 14% of females. A wide variety of solutions were presented, the most popular being a chassis with a vacuum-formed acrylic body. Some very innovative ideas were submitted. The most common circuit solution was one that contained an LDR and a transistor that powered a motor or a relay. The integration of the circuit into the body of the car proved difficult, hence some vehicles did not work effectively. In a number of cases the weight of the vehicle prohibited it from moving.

Task B

A playschool requires a toy suitable for young children. The movement of the toy should result in some form of secondary motion. Design and make a toy suitable for this purpose.

This was the most popular task amongst females (chosen by 45.8%) and the second most popular task amongst males (chosen by 24.3%). This task presented students with scope for creativity. However, some of the solutions presented were very simple with a minimal amount of work required. The most popular solutions were a toy with a cam and follower or an eccentric cam. Wood was the most common material used for this task.

Task C

Many people leave their homes to go on summer holidays. Plants can dry up during this time. Design and make a portable unit, incorporating a reservoir, which will automatically water a potted plant when its soil moisture content falls to a low level.

This task was one of the less popular, being attempted by just 2% of males and 4% of females. The solutions presented were very creative. Circuits were based on a transistor circuit, which powered a relay, which in turn worked a low-voltage pump. Many candidates successfully recycled a pump from a car windscreen wiper or some other mechanism.

Task D

Design and make a working model of an electro-mechanically controlled crane.

The solutions presented were generally of a very high standard. The tower crane was the most popular solution, followed closely by a JCB look-alike crane. A wide variety of materials were used in this task, including wood, metal and acrylic. The most common subsystem solution was a DPDT centre-off switch driving a motor, which was linked to a gear system. Some candidates did not address the issue of speed reduction; hence the gearboxes did not operate effectively. A number of candidates incorporated a means of swivelling the crane, as well as up and down movement.

Task E

The use of renewable energy sources is very important from an environmental point of view. Design and make a working model of a water-powered generator to power a small electrical system.

This task was the second most popular task amongst females (chosen by 17%) and the fourth most popular amongst the males (chosen by 12%). The majority of solutions presented were very creative and many candidates went to great effort to incorporate dams, reservoirs, generating stations, etc. The most typical solution was a structure in the form of a house with a water wheel, which was geared up to operate an LED positioned inside the house. A small number of solutions did not work due to a lack of mechanical advantage.

Task F

Many elderly and disabled people have difficulty climbing stairs. Design and make a model of an electro-mechanical device that will transport a person up and down a straight flight of stairs.

This task was the fifth most popular amongst both males and females; it was chosen by 9% of males and 8% of females. Some very elaborate and well-executed designs were presented. The most common solution was a pulley and belt drive with an attached seat. A number of candidates had difficulty in getting this task fully operational. The main problem areas were successfully attaching the seat to the belt and the selection of a suitable belt that would not slip. The majority of solutions did not contain limit switches.

Task G

Design and make a computer-controlled vehicle that will change direction after making contact with an object in its path.

This was the least popular task. A total of eight Task G projects were submitted nationwide, which represented less than 0.3% of candidates. Most solutions presented were very creative.

HIGHER LEVEL

Design Folders

There were some excellent folders presented in many centres, with candidates demonstrating a high degree of competence in IT skills. A large number of folders contained photographs and coloured sketches to enhance presentation. The standard of sketching and drawing presented in the folders has improved. However, some centres presented excellent products but poor quality folders, hence affecting the overall grades for those tasks. There are a small number of centres where clear misunderstandings exist as to the requirements of the various sections of the folder. The treatment of the subsystem component still remains a major weakness throughout the folders.

Analysis of the Brief

This section was, on the whole, reasonably well answered. However, some candidates neglected to set out specifications for their task at this stage. In a small number of cases the analysis sometimes incorrectly reverted to an analysis of a number of the given tasks.

Research and Investigation

The majority of candidates presented evidence of research gathered from a wide range of sources, including catalogues, websites, books and magazines, etc. However, many candidates failed to analyse the information gathered in a way that was useful in solving the task presented. A significant number of candidates failed to carry out any research on the subsystem (mechanical/electronic) component.

Design Ideas

The majority of candidates presented at least two design ideas. The quality of sketching was generally very good. However, annotation of sketches was frequently missing. Some candidates excluded any reference to the subsystem component of the task in their sketches.

Criteria for Selection of Solution

This section was reasonably well answered. The majority of candidates gave a valid reason for selecting their chosen design. In a number of cases, however, the selection of a solution was misunderstood as choice of task.

Working Drawings

The overall quality of the drawings presented in this section was significantly better than that of previous years. The integration of the circuit or mechanism into the working drawing was poor. Many candidates did not refer to the subsystem component at this stage.

Manufacturing Sequence

Overall, the manufacturing sequence was excellent. Some folders contained very detailed and elaborate step-by-step instructions for the stages of construction of the products. Many candidates took photographs or drew very comprehensive sketches to enhance presentation and relay the information more clearly. The majority of folders contained a materials list; however, the material sizes and costings were often ignored.

Testing and Evaluation

In general, this was one of the weaker sections of the folder. Many candidates were unwilling to highlight obvious defects and in many cases a glaring fault or omission in the product was not identified. A more thorough account of the problems encountered, whether solved or unsolved, and suggestions for future improvements are required.

Presentation

Most folders complied with the sub-headings and sequence as outlined on the design task Examination Paper (S-67). The majority of folders contained some work produced on computer. Some excellent quality folders were seen in some centres.

Product

The realisation of products was excellent. The majority of products presented fulfilled the chosen brief. The toy was the most popular task followed by the crane. Wood was the most dominant material used. However, more metal was used than in previous years, particularly in the crane. The joining of materials and the overall presentation of projects has improved. Most candidates appeared to have difficulty with the housing of circuits and mechanisms and the attaching of wires. Overall, soldering skills were very poor and this resulted in problems with getting circuits to work.

Subsystem

The majority of tasks included a working subsystem. It was evident however that the candidates did not give as much attention to the subsystem component as they did to the artefact. Housings for the circuits were frequently ignored. Wires were poorly attached and often simply left loose. In the case of tasks with mechanisms, candidates appeared to have difficulty with the accurate mounting of gear and pulley systems.

ORDINARY LEVEL

Design Folders

ICT was used more this year in the preparation of folder work, with positive results. Where ICT was not used, folders were in general well organised and sufficiently detailed throughout. However, it was common to find folders that were not complete, not structured correctly or had sections missing.

There was increased use made of computer-generated data. This ranged from simple word processing and spreadsheets to the use of more sophisticated graphic and image manipulation packages and a significant increase in the use of the Internet. However, the use of traditional graphical techniques continues to predominate.

Analysis of the Brief

This section presented problems for many candidates, especially lower-scoring candidates. In many cases the brief was simply restated. In a small number of cases the analysis sometimes incorrectly reverted to an analysis of a number of the given tasks to select the chosen task.

Research and Investigation

The majority of candidates presented evidence of research gathered from a wide range of sources, including catalogues, websites, books and magazines, etc. However, many candidates failed to analyse the information gathered in a way that was useful in solving the task presented. A significant number of candidates failed to carry out any research on the subsystem (mechanical/electronic) component.

Design Ideas

The majority of candidates presented at least two design ideas. The quality of sketching was generally very good; however, annotation of sketches was frequently missing. Some candidates excluded any reference to the subsystem component of the task in their sketches.

Criteria for Selection of Solution

This section was not well answered. The majority of candidates did not give valid reasons for selecting their chosen design. In a number of cases, however, the selection of a solution was misunderstood as choice of task.

Working Drawings

The quality of the drawings needs to be addressed in future, as the vast majority of drawings presented were not up to the required standard. The integration of the circuit or mechanism into the working drawing was also poor. Many candidates did not refer to the subsystem component at this stage.

Manufacturing Sequence

This section was reasonably well answered. Some folders contained very detailed and elaborate step-by-step instructions of the stages of construction of the products. This approach can be successful but also can be overdone by some candidates. The majority of folders contained a materials list; however, the material sizes and costing were often ignored.

Testing and Evaluation

In general, this section was one of the weaker components of the folder. Many candidates were unwilling to highlight obvious defects and in many cases a glaring fault or omission in the product was not identified. A more truthful account of the problems encountered, whether solved or unsolved, and suggestions for future improvements are required.

Presentation

Many folders did not comply with the sub-headings and sequence as outlined on the Design Task Examination Paper (S-67). However, some folders of excellent quality were seen in some centres.

Product

The majority of products presented fulfilled the chosen brief. The toy was the most popular task, followed by the crane. Wood was the most dominant material used. The joining of materials and the overall presentation of projects needs to be improved. Most candidates appeared to have difficulty with the housing of circuits, mechanisms and the attaching of wires. Overall, soldering skills were very poor and this resulted in problems with getting circuits to work.

Subsystem

Candidates did not give as much attention to the subsystem component as they did to the artefact. Housings for the circuits were frequently ignored. Wires were poorly attached and often simply left loose. In the case of tasks with mechanisms, candidates appeared to have difficulty with the accurate mounting of gear and pulley systems.

Written Examination

HIGHER LEVEL

General

The paper was widely received as being student-friendly. It offered good choice, was balanced and appropriately tested the candidates' knowledge of the syllabus. With few exceptions candidates attempted all of the required sections of the paper.

The candidates generally performed well in all questions, with the possible exception of questions relating to electronics and mechanisms.

The standard of graphical communication skills, as in previous years, varied greatly amongst candidates and it is felt that this general area should be the focus of greater attention.

Section A

The quality of answering was generally good, with many candidates achieving high marks in this section. The maximum mark of 100 was frequently achieved. Candidates achieved an average of 80 marks for this section. Those who provided satisfactory answers for Questions 11 to 15 generally also achieved high marks on the electronics question in Section B. Candidates frequently attempted more than the required twenty-five out of a possible thirty-two of questions in this section.

The following is an outline of the standard of answering for each of the questions.

1. This question was well answered by candidates who displayed good graphical communication skills.
2. There was a good standard of answering to this question; however, the representation of 'glass' was frequently incorrect.
3. The function of the 'tab' on a floppy disk was not widely known.

4. This question, relating to safety symbols, was generally well answered.
5. This question was well answered.
6. This question, relating to materials, was generally well answered.
7. This question was well answered.
8. Most candidates readily identified one advantage but frequently had a difficulty in stating a second.
9. The term ‘countersink’ was commonly omitted but the statement of ‘purpose’ was well answered.
10. This question was well answered.
11. The variable resistor was correctly identified in more cases than the thermistor.
12. Candidates frequently failed to outline a satisfactory advantage.
13. While this question was reasonably well answered, in many cases candidates only gave a final answer to the question and did not show the relevant calculations. This often resulted in a loss of marks.
14. This question was well answered.
15. While this question was generally well answered, candidates regularly failed to identify the significance of the third band on the resistor.
16. The ‘rack and pinion’ was correctly identified in more cases than the ‘bevel gears’.
17. This question was generally well answered. However, a number of candidates performed the calculation for one turn of the handle.
18. While this question was well answered, candidates were often not sufficiently specific in identifying the location of the ‘bearings’ on the diagram.
19. This question was generally answered correctly.
20. This question was well answered.
21. Almost all candidates correctly identified one energy conversion and most identified both.
22. This question relating to alternative energy sources was well answered.
23. This question was well answered.
24. This terminology question was well answered.
25. This question was generally well answered.
26. Candidates provided a wide variety of correct answers to this question.
27. This question was poorly answered.
28. This question was generally well answered.
29. While this question was reasonably well answered, candidates were often not sufficiently specific in identifying the location of the forces.
30. This question was well answered by candidates with good graphic skills.
31. Candidates who displayed good graphical communication skills also answered this question satisfactorily.
32. This question was generally well answered.

Section B

The standard of answering to questions in this section was generally quite good. The answers provided in Question 1, however, were usually better than in Question 2 and it is recommended that these areas should receive greater attention in the classroom.

- Question 1(a) was attempted by 35.6% of candidates while 63.1% opted for Question 1(b).
- Some 35.6% of candidates chose question 2(a) and 60.9% opted for Question 2(b).

Question 1(a)

The quality of sketching displayed in the answering was significantly improved when compared with previous years.

(i) The development was generally well answered. The calculation of the length of the curved surface was frequently incorrect and the dimension lines were often incorrectly represented.

(ii) There was a variation in the ability to communicate suitable designs. Jagged edges or blades, which were glued or screwed in place, were frequently presented as a solution to the problem.

(iii) This portion was generally well answered, with a wide variety of possible solutions presented. A wide variation in the ability to communicate ideas through graphical means was evident.

Question 1(b)

There was a significant degree of variation in the standard of answering of this question.

(i) The plan and elevation were, generally, well presented.

(ii) Solutions to the design and safety issues were correctly identified but sometimes poorly communicated.

(iii) Candidates frequently only gave one consideration factor instead of the required two.

Question 2(a)

There was a very wide variation in the standard of answering presented.

(i) The first two parts of this question were well answered; however, candidates were frequently unable to identify the function of the transistor correctly.

(ii) Candidates generally correctly identified the result of switching the components Z and W. In some cases candidates found it difficult to explain the purpose of the potential divider.

(iii) Candidates, in general, correctly identified tolerance as the meaning of the gold band; however, the range was frequently omitted or incorrectly stated.

Question 2(b)

(i) Candidates correctly named the gear arrangement shown and provided one advantage. Only a small number of candidates correctly identified a second advantage

(ii) While most candidates answered this part well many did not show any calculations or 'rough work' in their answer books. This absence of calculation and formulae prevented candidates from achieving stage marks. As a consequence candidates achieved either high marks or very low marks.

(iii) This part was generally well answered.

Section C

There was a marked difference between the questions in this section in terms of popularity. Question 3 proved by far the most popular and was attempted by 60.6% of candidates. Question 4 was attempted by 18.1%, Question 5 by 15.9% and Question 6 by only 4.7%. The average mark achieved by candidates in the various questions reflected the question popularity.

Question 3

As stated, this was the most popular question in this section and candidates generally achieved high marks. Candidates showed a good awareness of the issues involved. A significant number of candidates adopted a minimalist, and frequently vague, approach to answers, using single words or phrases in many cases. This approach did not allow candidates to maximize their marks.

(a) This part was generally well answered. Edison was frequently identified with the 'out of context' invention of the light bulb.

(b) This part was generally well answered.

(c) This part was also well answered.

Question 4

This question was reasonably popular and was generally well answered.

(a) (i) This part was well answered, with candidates providing a wide variety of responses.

(ii) Candidates generally gave a correct explanation of the term and, somewhat less frequently, gave a second means of achieving the movement.

(iii) There was a very wide variation in the standard of answers to this part. It is recommended that there should be a greater emphasis on students' graphical communication skills.

(b) This part was well answered and candidates were able to give examples of other uses of robotic control.

(c) This part was also well answered and reflected the standard of answering in part (c) of the previous question.

Question 5

This was generally a well-answered question, as many candidates identified with project work completed in school.

(a) This part was well answered and candidates showed a good understanding of the steps required to manufacture the hopper.

(b) The answers to this part were often not of the same quality as those to the previous part. In many cases there was significant room for improvement in the quality of the sketches.

(c) This part was well answered.

Question 6

Only a small minority of candidates attempted this question. There was a very good standard of answering of this question from a small number of examination centres.

(a) The logic gate was generally well identified. The truth table proved to be the most challenging part of this question. A significant number of candidates presented truth tables for the individual gates rather than for the 'system' of gates.

(b) This 'design modification' part was reasonably well answered.

(c) This part of the question, which pertained to safety, was well answered.

ORDINARY LEVEL

General

The overall standard of answering was satisfactory, with the majority of candidates attempting the required number of questions. A minority of candidates attempted more questions than was required. The standard of punctuation and grammar was very poor in many cases. Poor handwriting and inaccurate spelling were also common.

Section A

Most candidates attempted all of the questions in this section but very few scored full marks. The following is an outline of the standard of answering for each of the questions.

1. Approximately half of the candidates answered this question correctly.
2. This question was generally answered correctly, although 'Toggle Switch' was chosen, incorrectly, in a significant number of cases.
3. This question was generally answered correctly.
4. This question about inventors was generally answered correctly.
5. Approximately 60% of candidates answered this question correctly.
6. This question was poorly answered, with most candidates, incorrectly, choosing the 'Marking Knife'.
7. The majority of candidates answered this question correctly.
8. The majority of candidates answered this question about energy conversion correctly.
9. Approximately 60% of candidates answered this question on electronics correctly.
10. Approximately 50% of candidates answered this question correctly.

11. The majority of candidates answered this question correctly.
12. A significant number of candidates, incorrectly, chose ‘Rotates’ as the answer.
13. The majority of candidates answered this question about the guillotine correctly.
14. The majority of candidates answered this question correctly.
15. Most of the candidates, incorrectly, chose ‘9 V’ as the answer to this question.
16. The majority of candidates answered this question correctly.
17. Approximately 60% of candidates answered this question correctly.
18. This question was generally well answered, although some candidates avoided it.
19. Approximately 40% of candidates answered this question correctly.
20. Approximately 50% of candidates answered this digital logic question correctly.

Section B

Question 1

This was a very popular question, with most candidates scoring very well.

(a) (i) This part was reasonably well answered. Some candidates cited objectives rather than evaluative questions.

(ii) Most of the candidates chose Perspex as the material for the sides of the holder. Aluminium, MDF, plywood, and hardwoods such as oak, were other materials chosen.

(iii) This part was quite well answered, with most candidates suggesting the use of rubber feet, or a heavier base.

(b) This part was generally well answered. The end view tended to be drawn better than the elevation.

(c) (i) This part of the question was generally well answered.

(ii) This part was well answered, with most candidates making an appropriate sketch of the process involved.

(d) This part was reasonably well answered. Many candidates suggested that a decorative feature be applied to the letter holder. Some suggested compartmentalising it to accommodate different letters for different people. The most popular modification suggested was to put end pieces on the holder to prevent letters from falling out.

(e) Many suggested the use of mobile phones, email and fax as examples of how our means of communication have changed. The television was also given as an example. There were some good answers given as to how these changes may affect our environment. Some indicated that there would be fewer trees cut down, while others indicated the possible harmful effects of radiation.

Question 2

This question was attempted by approximately 70% of candidates with varying degrees of success.

(a) (i) Very few candidates answered this part correctly.

(ii) Approximately 50% of candidates answered this part correctly.

(iii) Very few candidates answered this part correctly. Just a few suggested the use of gearing. Many suggested using a lower voltage, while others suggested using a resistor to cut down the current and hence the speed. About 30% of those attempting this question got this correct.

(b) This part of the question was very poorly answered. Just a few correctly named two of the mechanisms and the majority of those who attempted the question failed to indicate the direction of the components. No candidate got full marks for this part of the question.

(c) (i) A large proportion of candidates did not attempt this part of the question.

(ii) Most answered this very well, citing 'no small parts and no loose parts' as a common answer.

(iii) This part was answered reasonably well.

(d) (i) Approximately 40% of candidates gave an appropriate response to this part of the question, indicating the structural advantage of using triangles.

(ii) A minority of candidates used the term 'friction', while many gave 'compression' as an answer.

(iii) This part was answered well, with various acceptable reasons being given.

(e) (i) This part of the question was generally well answered.

(ii) Many candidates suggested the use of 'suspensions' and 'light frames' as the answer to this part of the question.

Question 3

This was a very popular question, attempted by approximately 85% of candidates.

(a) (i) This part was generally well answered with most candidates selecting 'wood' as a suitable material.

(ii) The answers to this part of the question generally related to the use of glue or screws. Some cited nails or tacks as a means of fixing.

(iii) This part of the question was generally well answered.

(iv) This part of the question was reasonably well answered.

(b) Many candidates failed to get maximum marks for this part of the question as the improvements did not always relate to the design of the toy, but rather the finish.

(c) (i) Only about half of the candidates who attempted this question seemed to understand fully the drive mechanism of the truck.

(ii) Very few candidates scored full marks for this part of the question and most did not appear to understand the concept of energy conversion.

(d) This part of the question was generally well answered, with many candidates scoring the full 8 marks.

(e) This question was answered well by the majority of candidates.

Question 4

This was a popular question amongst candidates but was not very well answered.

(a) (i) Most of the candidates chose Perspex as a suitable material for the photograph holder.

(ii) Very few candidates scored full marks for this part, as they tended to ask evaluative rather than enquiring type questions such as 'is the photograph holder to be positioned on a shelf or on a wall?'

(b) This part of the question was well answered, with many candidates scoring the maximum 10 marks.

(c) This part of the question was generally poorly answered.

(d) Very few candidates scored the maximum marks for this part of the question.

(e) The majority of candidates scored maximum marks for this part of the question. Some candidates misinterpreted the question and named types of wood that could be used in the different categories.